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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/608,391	06/26/2003	Kenji Yamagami	16869B-082700US	8386

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EXAMINER

PATEL, HETUL B

ART UNIT	PAPER NUMBER
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2186

DATE MAILED: 01/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/608,391	YAMAGAMI, KENJI	
	Examiner	Art Unit	
	Hetul Patel	2186	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 November 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 8-10, 15-28, 30 and 31 is/are rejected.
- 7) ☒ Claim(s) 6, 7, 11-14 and 29 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|-----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This Office Action is in response to the communication filed on November 18, 2005. Claim 30 is amended and claims 1-31 are presented again for examination.
2. Applicant's arguments filed on November 18, 2004 have been fully considered but deemed to be moot in view of new ground rejection.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-4, 8-10, 15-24, 26-28 and 30-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kusters et al. (USPN: 6,473,775) hereinafter, Kusters in view of Jacobson et al. (USPN: 2004/0068636) hereinafter, Jacobson.

As per claim 1, Kusters teaches a method for processing data in an application data store comprising: producing at least a first snapshot of an application data store, the application data store configured to receive data by way of write operations issued from a host device; producing a journal entry for each write operation issued from the host device; storing each journal entry in a journal data store (i.e. the differential file), thereby accumulating a list of journal entries; monitoring an amount of free space on the journal data store; and when the free space falls below a first threshold value, then the

size of the differential file is increased (e.g. see the abstract, Col. 8, lines 7-17; Col. 10, lines 27-39 and Fig. 5).

However, Kusters does not teach about increasing the free space by removing one or more journal entries from the journal data store when the free space falls below a first threshold value. Jacobson, on the other hand, teaches that when the physical storage space capacity warning comes up, either additional disks can be added or unused virtual storage volumes can be removed. Jacobson further teaches about automatic removal of virtual storage volumes (e.g. see paragraph [0051]). Accordingly, it would have been obvious to one of ordinary skill in the art at the time of the current invention was made to implement the teaching of Jacobson in the method taught by Kusters. In doing so, the storage space capacity can be handled wisely without adding additional storage disks. Therefore, it reduces the cost of the system. The further limitation of removing enough journal entries so that the free space rises above a second threshold value is inherently embedded in the method taught by Jacobson.

As per claims 8, 15, 18, 21, 26, 28 and 30, see arguments with respect to the rejection of claim 1. Claims 8, 15, 18, 21, 26, 28 and 30 are also rejected based on the same rationale as the rejection of claim 1.

As per claim 2, the combination of Kusters and Jacobson teaches the claimed invention as described above and furthermore, Jacobson teaches about removing one or more journal entries includes updating the first snapshot by applying one or more journal entries to the first snapshot, beginning with an oldest journal entry (i.e. according to priorities), wherein journal entries applied to the first snapshot are removed from the

list of journal entries thereby increasing the free space of the journal data store (e.g. see paragraph [0015]).

As per claim 3, the combination of Kusters and Jacobson teaches the claimed invention as described above and furthermore, Jacobson teaches that removing one or more journal entries includes identifying a selected snapshot that is earlier in time than an oldest journal entry (i.e. according to priorities) and is closest in time to the oldest journal entry than other snapshots and updating the selected snapshot with one or more journal entries beginning with the oldest journal entry (e.g. see paragraph [0015]).

As per claim 4, the combination of Kusters and Jacobson teaches the claimed invention as described above and furthermore, Jacobson teaches that removing one or more journal entries includes looking for a most recent snapshot, removing journal entries in the journal data store that are earlier in time than the most recent snapshot, i.e. in other words, removing the older/earlier portion of the snapshot volume to write the new/most portion of the snapshot volume (e.g. see paragraph [0015], [0051] and the abstract).

As per claim 9, the combination of Kusters and Jacobson teaches the claimed invention as described above and furthermore, Kusters teaches the step of updating includes periodically monitoring the free space of the journal data store and if the free space falls below a first threshold then updating the at least first snapshot (i.e. by performing the copy-on-write operation) (e.g. see Col. 8, lines 7-17 and Figs. 5-6).

As per claim 31, see arguments with respect to the rejection of claim 9. Claim 31 is also rejected based on the same rationale as the rejection of claim 9.

As per claim 10, the combination of Kusters and Jacobson teaches the claimed invention as described above and furthermore, Jacobson teaches the step of updating the at least first snapshot is repeated for a number of journal entries so that the free space rises above a second threshold value (e.g. see paragraph [0051]).

As per claims 16, 23 and 24, the combination of Kusters and Jacobson teaches the claimed invention as described above and furthermore, Kusters teaches that the selected snapshot is earlier in time than the oldest journal entry and closest in time to the oldest journal entry than other snapshots, i.e. the selected snapshot is earlier than the oldest differential file and closest to the oldest differential file than the other snapshot files (e.g. see the abstract, Col. 8, lines 7-17; Col. 10, lines 27-39 and Figs. 5-6).

As per claims 17 and 19, the combination of Kusters and Jacobson teaches the claimed invention as described above and furthermore, Kusters teaches that the method further comprising associating sequence numbers to the snapshots and to the journal entries, wherein the selected snapshot is associated with a sequence number that is greater than a sequence number associated with an oldest journal entry by a predetermined amount, i.e. the selected snapshot is older than the oldest journal entry; and wherein the selected snapshot is determined based on the sequence numbers of the snapshots and the sequence number of the oldest journal entry, i.e. the selected journal entry is determined based on how old the snapshot and journal entry is (e.g. see Col. 10, lines 27-39 and Figs. 5-6).

As per claim 20, the combination of Kusters and Jacobson teaches the claimed invention as described above and furthermore, Kusters teaches in the “wrapping” approach, journal entries (i.e. the differential files) are sequentially allocated and contiguously arranged in the journal data store in a manner representative of a sequential list of journal entries, wherein the step of storing includes wrapping to a beginning of the list of journal entries to reuse earlier journal entries when an end of the list of journal entries is reached (e.g. see Col. 9, lines 2-12).

As per claims 22, the combination of Kusters and Jacobson teaches the claimed invention as described above and furthermore, Kusters teaches that the step of recording is initiated prior to producing a snapshot, so each write operation that issues during a period of time that a first snapshot is being produced will be recorded in a journal entry, i.e. writing any updates, during snapshot production, into the journal entry/the differential file (e.g. see the abstract).

As per claim 27, the combination of Kusters and Jacobson teaches the claimed invention as described above and furthermore, Kusters teaches that if a determination is made to apply some of the journal entries (i.e. differential files) to one of the snapshots, then identifying an oldest journal entry, i.e. the oldest differential file; identifying a selected snapshot based on a sequence number associated with the oldest journal entry and on sequence numbers associated with the snapshots; and updating the selected snapshot with one or more journal entries, beginning with the oldest journal entry, i.e. updating the snapshot file by replacing one or more oldest differential files with one or more new differential files (e.g. see Col. 8, lines 65+ and Fig. 6).

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4. Claims 5 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kusters in view of Jacobson, further in view of Mattson et al. (USPN: 5,551,003) hereinafter, Mattson.

As per claim 5, the combination of Kusters and Jacobson teaches the claimed invention as described above. However, both failed to teach that the first and second threshold values are different. Mattson, on the other hand, teaches that the first threshold value (which is smaller) and the second threshold value (which is larger) are different (e.g. see Col. 5, lines 61-67). Accordingly, it would have been obvious to one ordinary skilled in the art at the time of the current invention was made to modify the method taught by the combination of Kusters and Jacobson by making the first threshold value smaller and the second threshold value larger as taught by Mattson. In doing so, the removal of journal entries will begin as soon as the free space falls below the first threshold value and will stop as soon as the free space rises above the second threshold value.

As per claim 25, see arguments with respect to the rejection of claim 5. Claim 25 is also rejected based on the same rationale as the rejection of claim 5.

Allowable Subject Matter

5. Claims 6-7, 11-14 and 29 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hetul Patel whose telephone number is 571-272-4184. The examiner can normally be reached on M-F 8-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matt Kim can be reached on 571-272-4182. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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MATTHEW D. ANDERSON
PRIMARY EXAMINER